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EXPERT REPORT

United States of America v. Pharmacia Corporation, et al; Pharmacia Corporation and Solutia Inc. v. United States of America, et al., Civil Action No. 99-63-DRH
(Southern District of Illinois)

Submitted to:

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PLAINTIFFS' EXPERT REPORT: CHARLES MENZIE, Ph.D.

This expert report is submitted by Charles Menzie on behalf of Pharmacia Corporation and Solutia Inc.

A. Qualifications

I am president of Menzie-Cura & Associates Inc. located at 1 Courthouse Square, Chelmsford, MA 01824. I have been evaluating the sources, fate and transport, and environmental and human health effects of chemicals since the early 1980s. I have been examining data related to Dead Creek and adjacent landfills and industries since the 1980s. I was responsible for designing and implementing studies of sediment contamination in Dead Creek – for use in risk assessment - as part of a remedial investigation of Area I Sites. This work was performed in the late 1990s and was used to prepare an ecological risk assessment for the lower portion of Dead Creek and the Borrow Pit Lake. A copy of my curriculum vitae is enclosed in Attachment 1 of this report.

B. Opinions

My opinions are as follows:

1. American Zinc and AMAX were sources of chemicals that resulted in contamination of sediments in Dead Creek. Waste materials and emissions from American Zinc included Gypsum (scale), Cell Sludge, Contaminated Soils, Atmospheric Releases (also AMAX), Sewer Discharges (also AMAX), Mercury Sludge from Acid Plant, and Cooling Tower Residue. Chemicals-of-concern for Dead Creek that were associated with these included zinc, copper, lead, cadmium, manganese, mercury, silver, arsenic, aluminum, cobalt, PCBs, and acid. These chemicals reached Dead Creek either via sewer discharges, placement in landfills adjacent to Dead Creek (with subsequent runoff or leaching), and off-site transport on trucks. The chemicals-of-concern associated with American Zinc and AMAX exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.
2. Cerro Copper was a source of chemicals that resulted in contamination of sediments in Dead Creek. Waste materials and emissions from Cerro Copper included direct discharge of wastewaters to Dead Creek CS-A, burial of slag, and placement of contaminated materials in other landfill sites bordering Dead Creek. Chemicals-of-concern for Dead Creek that are associated with Cerro Copper include copper, lead, cadmium, zinc, mercury, silver, arsenic, nickel, PCBs and chlorinated solvents. The chemicals-of-concern associated with Cerro Copper exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.

3. The Chemical Warfare Service was a source of contamination to sediments and surface waters of Dead Creek. Chemicals associated with wastes from Chemical Warfare Service reached Dead Creek either as a result of placement of wastes in landfills bordering the creek with subsequent runoff or leaching to the creek or as a result of periodic releases via the sewer system. Contamination from the Chemical Warfare Service operations is present in the landfills and has influenced conditions in the northerly segments of Dead Creek.
4. Darling Fertilizer was a source of chemicals that resulted in contamination of sediments in Dead Creek. Waste materials and emissions from Darling Fertilizer included direct discharge of wastewaters to Dead Creek (prior to 1943) and overflows (after 1943), placement of contaminated materials in landfill sites bordering Dead Creek, and atmospheric emissions that contributed to the presence of contamination in the Dead Creek watershed. Chemicals-of-concern for Dead Creek that are associated with Darling Fertilizer include zinc, lead, and cadmium. The chemicals-of-concern associated with Darling Fertilizer exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.
5. Kerr Mc-Gee (Moss Tie) was a source of chemicals that resulted in contamination of sediments in Dead Creek. Waste materials from Kerr-McGee (Moss Tie) included overflows ~~of stormwater to~~ Dead Creek CS-A and placement of contaminated materials in other landfill sites bordering Dead Creek. Chemicals-of-concern for Dead Creek that are associated with Kerr-McGee (Moss Tie) include polycyclic aromatic hydrocarbons (PAHs), non-chlorinated aromatic hydrocarbons, 2-butanone, pentachlorophenol, other phenolic compounds, chlorinated solvents, and dioxins. The chemicals-of-concern associated with Kerr-McGee (Moss Tie) exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.
6. Midwest Rubber was a source of chemicals that resulted in contamination of sediments in Dead Creek. Waste materials from Midwest Rubber included direct process wastewater discharges to Dead Creek prior to 1933 and overflows thereafter. Midwest Rubber also disposed of solid wastes in landfills bordering Dead Creek; chemicals in these materials reached the creek either through runoff or leaching. Chemicals-of-concern for Dead Creek that are associated with Midwest Rubber include PCBs, methylene chloride, various pesticides, PAHs, BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), phenols, phthalates, nitrosodiphenylamine, and metals (chromium, lead, manganese, zinc, barium, and mercury.) The chemicals-of-concern associated with Midwest Rubber exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.
7. The Mobil Oil Refinery in East St. Louis was a source of chemicals that resulted in contamination of sediments in Dead Creek. Waste materials from Mobil included periodic wastewater discharges to Dead Creek and the disposal of solid wastes and sludges in landfills bordering Dead Creek; chemicals in these materials reached the creek either through runoff or leaching. Chemicals-of-concern for Dead Creek that are associated with Mobil include PAHs, BTEX compounds, non-chlorinated phenolic compounds, and the metals lead, nickel,

chromium, and vanadium. The chemicals-of-concern associated with Mobil exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.

8. Praxair was a source of chemicals that resulted in contamination of sediments in Dead Creek. Waste materials from Praxair included releases at the property with subsequent transport to Dead Creek via overland flow. Chemicals-of-concern for Dead Creek that are associated with Praxair include mercury and copper. The chemicals-of-concern associated with Praxair exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.
9. Rogers Cartage was a source of chemicals that resulted in contamination of sediments in Dead Creek. There were two facilities. The older facility, located off Cargill Road in Cahokia, contributed to the contamination of sediments in Dead Creek CS-F and the Borrow Pit Lake. This occurred as a result of runoff from the truck washing operation located there. The facility presently located in Sauget contributed to contamination in Creek Segment CS-A and downstream creek segments via continually occurring sewer overflows into CS-A. Chemicals-of-concern for Dead Creek that are associated with Rogers include PCBs, chlorinated benzenes, chlorinated solvents, PAHs, pentachlorophenol, alpha BHC, phthalates, and metals (aluminum, mercury, thallium, and zinc). The chemicals-of-concern associated with Rogers exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.
10. Ruan (Waggoner) was a source of chemicals that resulted in contamination of sediments in Dead Creek. There were two facilities. The older facility, located at the head of CS-A (On Site I) contributed to the contamination of sediments in Dead Creek CS-A and via flow from this creek segment to the contamination of downstream segments. The second facility was located on the east side of Dead Creek at the head of CS-B. At both facilities, trucks were washed directly into the creek or onto the ground. In the case of the second facility pits were eventually constructed to retain washwater. These were unlined and leached. Chemicals-of-concern for Dead Creek that are associated with Ruan (Waggoner) include PCBs, chlorinated benzenes, 4-chloroaniline, PAHs, BTEX, phenols, pentachlorophenol, phthalates, and metals (aluminum, arsenic, cadmium, and zinc). The chemicals-of-concern associated with Ruan (Waggoner) exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.
11. Wiese was a source of chemicals that resulted in contamination of sediments in Dead Creek. Wiese operated a facility on the south side of Queeny Avenue and west side of Dead Creek. Releases of chemicals occurred as a result of servicing various pieces of equipment (mainly forklifts). Chemicals were released onto the ground surface where they could subsequently reach Dead Creek via runoff. Chemicals were also released to a sewer line that discharged to Dead Creek segment CS-B. Chemicals-of-concern for Dead Creek that are associated with Wiese include PCBs and PAHs. The chemicals-of-concern associated with Wiese exceed toxicological thresholds used to judge sediment contamination throughout Dead Creek.

C. Data Relied Upon

Data relied upon include observations made during site visits to Dead Creek and adjacent areas, on depositions of various individuals familiar with operations at various facilities and with conditions in the area, on the Expert Reports prepared by other experts for Pharmacia and Solutia, on analyses of industry data, on examination of data for Dead Creek sediments, the adjacent landfills, and groundwater, on government documents, and on materials produced as a result of discovery. These are described in the individual chapters of Attachment 2. Discovery is continuing in this case and my report reflects the information currently at hand. As additional information becomes available, I anticipate that more detail on the companies and pathways may be discovered. This information could be used in the future to supplement and/or refine the opinions presented above and documented in Attachment 2.

D. Basis of Opinions

I have reached my opinions in this matter on the basis of site visits and an evaluation of the information cited above. This evaluation is given in my October 2002 report entitled *Evaluation of Sources of Contamination to Dead Creek and Adjacent Landfills*. The report is included as Attachment 2.

E. Trial Exhibits

I expect to develop exhibits to summarize, demonstrate or support my opinions including, but not limited to, maps, tabulated data, or illustrative diagrams.
Compensation

My compensation for work on this case is calculated on a hourly basis. This rate is \$155/hour for research, analysis and report preparation. My rate is \$375/hr for deposition and trial testimony.

G. Testimony as an Expert

The following lists my experience as an expert witness.

Morgan, Lewis & Bockius for Federal Pacific Electric Company in Federal Pacific Electric vs. Home Insurance Company. Superior Court of New Jersey, Mercer County. DOCKET NO. MER-L-5192-96

Expert report written and deposition given concerning PCBs at the Cornell-Dubilier Electronics (CDE) facility in New Bedford MA and the pathways by which these PCBs were transported to the harbor.

Coburn & Croft for Monsanto in Cerro Copper Products Co. v. Monsanto Company, Case No. 92-CV-204-PER, United States District Court for the Southern District of Illinois

Expert report written and deposition testimony given related to potential sources of PCBs from Cerro Copper to Dead Creek. Testimony was based on a review of operations and conditions at Cerro Copper.

Coburn & Croft for Joseph C. Burt in Joseph C. Burt v. Sparton Engineered Products, Inc., Case No. 93-CV-04296-JPG, United States District Court for the Southern District of Illinois

Expert report written and deposition testimony given related to damaged to Mr. Burt's farm resulting from the pollution of Seminary Creek that runs through his farm land.

Tillinghast, Collins & Graham for Eastern Gas & Electric in Eastern Gas & Electric vs. Commonwealth of Massachusetts. Massachusetts Court.

Deposition testimony given related to toxicity and health risks posed by cyanide compounds in soils and groundwater at the Mendon Road site.

New York City Department of Environmental Protection for City of New York. New Jersey Court.

Expert report written and deposition and trial testimony given related to ecological risks associated with siting an incinerator in New Jersey adjacent to the Arthur Kill River.

Parker, Poe, Adams & Bernstein for Stewart-Warner Corp. in ILCO – Unican Corporation v. Stewart-Warner Corporation

Expert report written and deposition testimony given regarding imminent health hazard associated with heavy metals at the site.

ATTACHMENT 1

Curriculum Vitae for Charles A. Menzie

12.0 EVALUATION FOR ROGERS CARTAGE

X Rogers Cartage (Rogers) operated out of two locations within the Dead Creek drainage area (Figure 12-1). This figure also shows pathways by which chemicals associated with facility operations reached Dead Creek. The first location, referred to in this report as Rogers I, was located along Carlisle Road in Cahokia.¹ This was a tract of five acres² located on Red House Road which is also known as Cargill Road.³ Rogers II is located on Falling Springs Road in Sauget. This chapter of the report provides supporting information for the occurrence of these chemicals at the facilities, for their transport and disposal, and identifies specific Dead Creek Chemicals-of-Concern associated with Rogers.

Figure 12-2 provides a conceptual model for the transport and disposal of waste materials from Rogers I and II. Sections 12-2 to 12-4 provide supporting information for this conceptual model. As shown in Figure 12-2, the major transport pathway for Rogers I was drainage flow to Dead Creek CS-F. For Rogers II, the major pathway was discharge to the sewer with subsequent overflow to Dead Creek CS-A.

With regard to the conceptual models given in Figures 12-1 and 12-2, certain time periods are important. As Figure 12-3 illustrates, discharges from Rogers I occurred in the 1960s and would have reached the lower portion of Dead Creek, i.e. CS-F. From there, chemicals discharged from Rogers I would be transported downstream to the Borrow Pit Lake. The Rogers Cartage terminal in Sauget was established in 1970.⁴ From the early 1970s to the present, Rogers has operated from its Sauget location. The discharges went to the sewer and would have entered Dead Creek CS-A during overflow periods. While flow from CS-A to CS-B was partially restricted during the early 1970s, it continued until the 1975/1976 timeframe when the culvert at Queeny Avenue was sealed with concrete. Therefore, for an approximately five-year period releases from Rogers Cartage to CS-A would have also been transported to CS-B and from there to CS-C through CS-F. After 1975/1976, releases from Rogers Cartage to CS-A would have contributed to the contamination of sediments in CS-A. It is uncertain how complete this blockage was and there are reports that flows from CS-A to CS-B occurred after this date. CS-A was closed in 1990. Therefore, the contribution of Rogers II would be primarily to Dead Creek CS-A and would have occurred during the 1970s and 1980s, a period of ~20 years. During the first five years of this period, there was known communication between CS-A and CS-B. During the following 15 years, there could be occasional releases from CS-A to CS-B depending on the integrity of the concrete plug in the culvert at Queeny Avenue.

This chapter of the report is organized into five sections. Section 12.1 provides an overview of facility operations. Section 12.2 describes waste discharges. Section 12.3

¹ Plot plan showing location of buildings for Rogers Cartage on Red House Road, RC 1670 – 1676.

² Plot definition for property located in Cahokia and part of Parcel "A" conveyed to Phillips Pipe Line Company. RC 1669

³ Map of East St. Louis. Published and Copyrighted by Henry E. Gross, Engr. St. Louis

⁴ Response to Request for Information Pursuant to 104 (e) Transmitted in November 1994. DCG 016966

Figure 12-1. Contaminant Transport Routes from Rogers Cartage I[South] (Off Cargill Road, Cahokia) to Dead Creek

Rogers Cartage
(South)

Creek Segment F

KEY*: (Map Source: 1973 Aerial Photograph)

*Note: Locations and boundaries are for illustrative purposes only.
They do not represent exact positions or pathways.



Location of Dead Creek



Location of Company of Interest



Runoff to Dead Creek






This figure reflects information obtained from available documents as well as opinion.

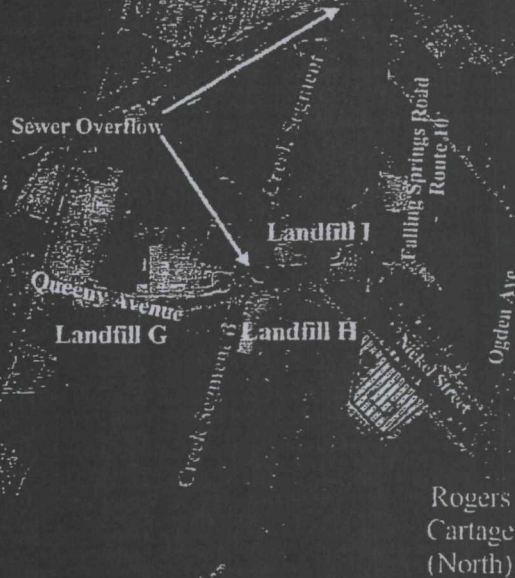
Figure 12-2. Contaminant Transport Routes from Rogers Cartage II [North] (Off Nickel Street, Sauget) to Dead Creek

This figure reflects information obtained from available documents as well as opinion.

KEY*: (Map Source: 1973 Aerial Photograph)

*Note: Locations and boundaries are for illustrative purposes only. They do not represent exact positions or pathways.

-  Location of Dead Creek
-  Location of Company of Interest
-  Approximate Sewer Line Location with Overflow



**Figure 12-3. Contaminant Transport Conceptual Model for Rogers II
(Off Nickel St. Sauget) and Rogers I (Off Cargill Road, Cahokia)
(Reflects Opinion and Fact)**

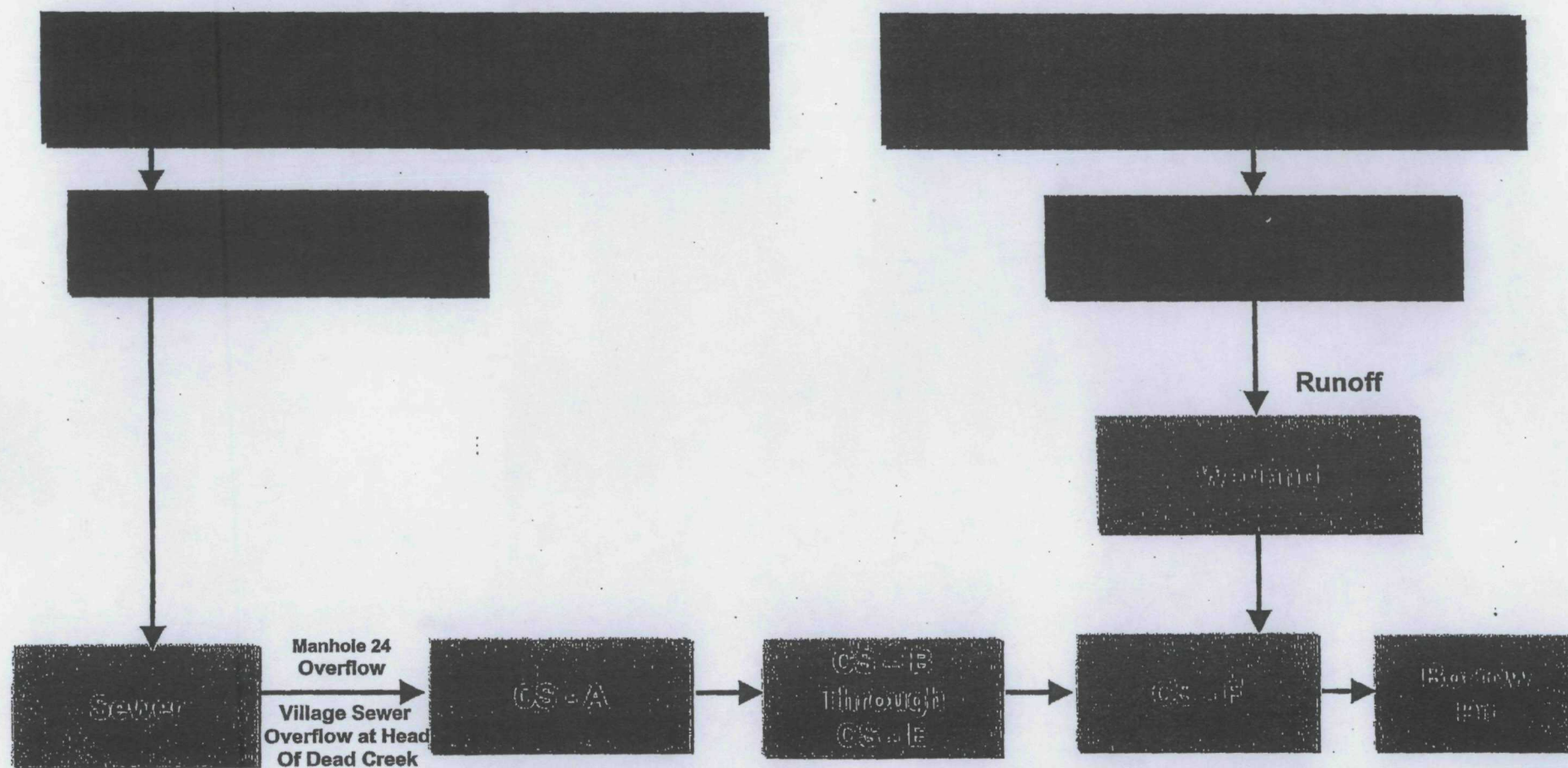
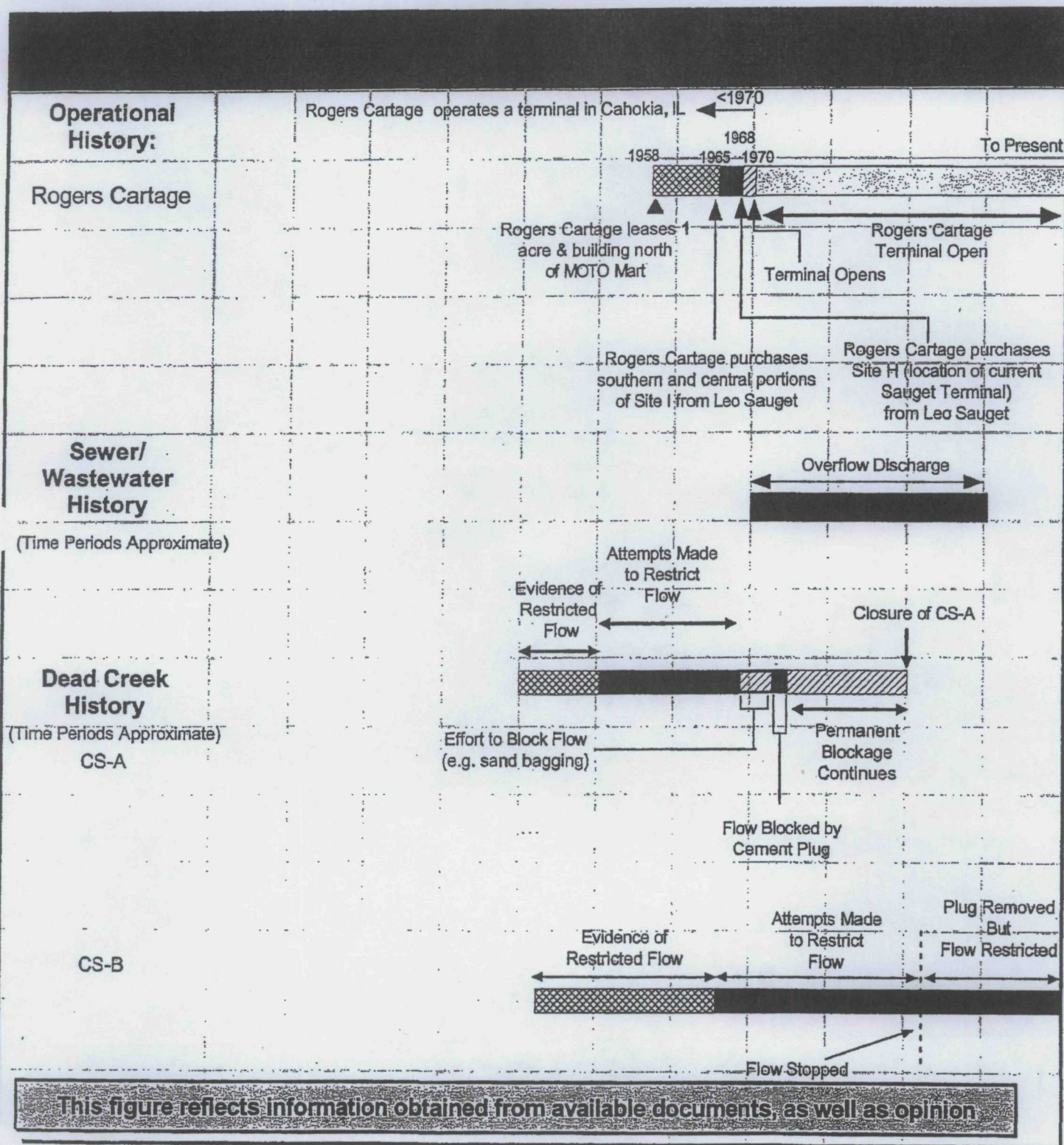


Figure 12-4. Timeline Analysis for Rogers I - South (off of Cargill Road) and Rogers II - North (off of Nickel Street, Sauget)



identifies Dead Creek chemicals-of-concern that are associated with Rogers. Section 12.4 documents transport pathways. Section 12.5 determines the locations and creek segments in Dead Creek for which Rogers is considered a contributor of contamination.

12.1 Description of Facilities

Rogers operated its chemical hauling business out of tank truck terminals at the locations shown in Figure 12-1. The specific operation at the terminals that resulted in releases of chemicals to Dead Creek was the washing and cleaning of the tank trailers.

The following description is taken from a USEPA (1982) inspection report: this facility is a tank truck washing operation.⁵ The principal agent used for cleaning the interior of the tank trucks is a hot water wash; however hot caustic and a steam solvent are used on truck interiors that have transported particularly sticky, hard to hot-wash, chemical substances. The caustic tank when fully charged contains 400 gallons in a 500 gallon tank. The caustic after being used to clean the interior of a tanker is recirculated back to the caustic tank. When the caustic becomes spent, it is discharged into the sewer system. Usually, 100-150 gallons of caustic are discharged at one time to the sewer. Mr. Tolbird stated that the Sauget Wastewater Treatment Plant (WWTP) is informed before the caustic discharge occurs. The use of the caustic varies dependent upon what type of tankers are being cleaned. If the material hauled in a tank was a very sticky compound such as petroleum additive or can coating, the caustic is used to clean the tanker. Hot coils underneath the caustic tank keep the caustic temperature at 180-190°F.

Rogers also uses a solvent wash on certain tankers. The solvent usage varies just like the caustic depending on what chemical compounds were previously transported in the tanker. Mr. Tolbird stated to the USEPA that solvent usage is approximately 15-30 gallons per tanker requiring this particular type of wash and the solvent is flushed down the sewer following the wash. The discharge of washwater for 1980 is identified by Rogers as 33,807 gal/day to the sewer.⁶

The wastewater from the tank cleaning operation flows to a series of settling tanks before being discharged to the sewer system.⁷ The three settling tanks have a capacity of approximately 300-500 gallons each. The tanks have a concrete cover. They were installed around 1980. Mr. Tolbird stated that they haven't removed any accumulated sludge in these tanks since they were installed. USEPA notes that the sludge from the tanks would probably be considered a hazardous waste when they are cleaned.

The company has two truck washing bays at this facility. There is a cleaning facility that washed tank trailers at the Sauget terminal of Rogers.⁸ There is a two-bay cleaning wick.

⁵ U.S. Environmental Protection Agency. 1982. Compliance Sampling Inspections. Toxics in the area of Sauget, IL. Region V Central District Office. DCG 016495

⁶ American Bottoms Industrial waste Survey Questionnaire. Complte by Rogers Cartage on 5/9/80. CER 127057

⁷ U.S. Environmental Protection Agency. 1982. Compliance Sampling Inspections. Toxics in the area of Sauget, IL. Region V Central District Office. DCG 016495

⁸ James E. Bucko testimony, 2/10/99 p. 27

The cleaning bays would accommodate a truck and trailer. The trailer would be pulled under a rack.

12.2 Sources and Characteristics of Chemicals from Rogers

Releases of chemicals from Rogers occurred via several sources. The major sources of chemicals associated with operations from Rogers include:

1. Contaminated wash water associated with cleaning operations
2. Release of product materials for shippers associated with heel or residue
3. Release of chemical wastes

Rogers provided little training to their employees on how to recognize specific materials, handle hazardous material with respect to controlling spills or limiting the introduction of chemicals to waste streams (sewers, sumps, runoff) leaving the site.^{9,10,11} During the period when Allyn Conrad was manager of the facility, the tank washers did not document how materials were handled.¹² It was evident that even in the 1990s there was a lack of knowledge in the facility on handling materials and on proper documentation.¹³

In addition to washing its own trailers, Rogers provided washing services for some Slay and some Ruan trailers.^{14,15} Tables 12-1 and 12-2 provide an overview of materials hauled by Rogers. Releases of chemicals from these materials as wash water or heels is judged to be the major source of chemicals. In 1989, Rogers was approached to clean trucks that have hauled Lasso Herbicide.¹⁶ They estimated that this would be 200 trucks over a three-month period. The active ingredient is alachlor.

⁹ Franklin A. Phillips, 1998 Expert Witness Disclosure Statement

¹⁰ Gilbert Johnson deposition p. 828

¹¹ Gilbert Johnson deposition p. 16

¹² Donel Johnson deposition p. 91

¹³ Ruth Levin testimony, 2/10/99, p. 20

¹⁴ John Johnson deposition p. 55, Rogers 39121

¹⁵ Letter from Ruan requesting trailer washing in 1974.

¹⁶ David Kimbriel letter to George Schillinger, 3/30/89, Rogers 0816

Table 12-1. Products Hauled by Rogers Cartage.

Material	Shippers	1970 thru Mid 80s¹⁷	In 1989¹⁸	Chemicals Listed in 1004 (6) of RCRA for 1990¹⁹
Acetic Acid			X	
Aluminum Chloride	General Chemical	X		
Ammonium Bisulfate			X	
Anhydrous Ammonia	Monsanto/Solutia	X		
Bonerite			X	
Calcium Chloride	G.S. Robins	X		
Caustic Soda	Dow Chemical TriCity Port	X		
Cleaning Compound (containing DDBSA)			X	
Chlorosulfonic Acid				X
Corrosive Cleaning Compound and Liquid Cleaners	Parker/Henkel	X	X	
Crude Petroleum Treating Compound	Petrolite/Tretolite			
Cresol (wood treating)	Kopcoat			
Denatured Alcohols			X	
Di-Chlorobenzene				X
Dodecylbenzenesulfonic Acid				X
Ethyl Acetate			X	
Fatty Acid	Azko, Procter and Gamble	X		
Fertilizers	U.S. AgriChemical	X		
Flammable Resin and Varnishes	Reichhold Chemical	X	X	
Formaldehyde			X	
Formic Acid			X	
Glycol			X	
Grease			X	

¹⁷ Listed in a table at Rogers 1677

¹⁸ David Kimbriel letter (Rogers Cartage) to John Thiel (Homer and Shifrin), 5/17/89

¹⁹ David Kimbriel letter (Rogers Cartage) to William Child (IEPA), 2/27/90, DCG 016659

Material	Shippers	1970 thru Mid 80s ¹⁷	In 1989 ¹⁸	Chemicals Listed in 1004 (6) of RCRA for 1990 ¹⁹
Hydrochloric Acid	Monsanto/Solutia	X	X	X
Lasso Herbicide	Monsanto/Solutia	X	X	
Latex			X	
Maleic Anhydride	Monsanto/Solutia	X	X	X
Methyl Isobutyl Ketone			X	
Mono Chlorobenzene	Monsanto/Solutia	X	X	
Naphtha			X	
Naphthalene				X
Nitric Acid			X	
Oil			X	
Oil Additive			X	
Oleum				
Ortho-Nitrochlorobenzene	Monsanto/Solutia	X	X	
Paint	Center Line Industries		X	
Petroleum Additives	Edwin Cooper/Ethyl Corp, Monsanto	X		
Phosphoric Acid	Monsanto/Solutia	X	X	X
Phenol	Into Petrolite			
Phosphoric Oxychloride				X
Phosphoric Trichloride	Monsanto/Solutia			X
Plasticizer	Monsanto/Solutia	X	X	
Santochlor	Monsanto/Solutia	X		
Silicate	Du Pont	X		
Soaps	Lever Brothers, Purex Corp	X	X	
Sodium Hydroxide			X	X
Sodium Hypochlorite			X	
Sodium Thiosulfate			X	
Styrene			X	X
Sulfuric Acid	AMAX, Big River, Monsanto	X	X	X
Textile Softner			X	
Titanium Dioxide	National Lead	X		

Material	Shippers	1970 thru Mid 80s¹⁷	In 1989¹⁸	Chemicals Listed in 1004 (6) of RCRA for 1990¹⁹
Therminol (contains PCBs)	Monsanto/Solutia			
Woodtox			X	
Xylene				X
Zinc Chloride			X	X
Zinc Phosphate			X	
Zinc Sulfate	AMAX, Big River Zinc		X	X

**Table 12-2. Materials transported by Rogers over a 1-Month period.
(Prepared for U.S. EPA, Region V by GCA Corporation, August 1982)**

Commodity/Trade Name	No. of Trucks Serviced	Type of Wash		Comments
		Caustic	Hot Water	
Formaldehyde	4		X	
Deicer	4		X	• Airline deicer fluid
Alum	8	X	X	
Dibutyl hydrogen phosphate	1		X	
Muriatic acid	3		X	• Commercial grade of MCI
Silicate	2		X	
Fatty acid	11		X	• Soap
Phosphoric acid	3		X	
Zinc sulfate solution	2		X	

Commodity/Trade Name	No. of Trucks Serviced	Type of Wash		Comments
		Caustic	Hot Water	
Triethylene glycol	1		X	
Polypropylene glycol	1		X	
Caustic	14		X	
Can Coating	5		X	• Water soluble resin
Polymer	3	X	X	
Plasticizer	11	X	X	
Resin	2	X	X	
Linseed oil	1	X	X	• Used in paint industry
Hydraulic oil	1	X	X	
Mineral apirita	1		X	

Commodity/Trade Name	No. of Trucks Serviced	Type of Wash		Comments
		Caustic	Hot Water	
Petroleum naphtha	1		X	• Aromatic solvent
Xylene/Benzene	1		X	• Trace quantities of benzene
Phenol	3		X	
Alcohol	1		X	
Alkane	1	X	X	
Flowcon	13	X	X	• Oil drilling fluid
Santochlor	2		X	• (dichlorobenzene)
Process oil	1	X	X	
Motor Oil	2	X	X	
Crude treating compound	21	X	X	• Descaler (combustible)

Commodity/Trade Name	No. of Trucks Serviced	Type of Wash		Comments
		Caustic	Hot Water	
Black oil	1	X	X	• Road oil (heavy oil)
Skim oil	1	X	X	• API separator
Soybean oil	11		X	
Lard	1		X	
Fatty alcohols	1		X	
Food grade oil	1		X	
Paint increasing compound	5	X	X	• Contains some cologne
Paint (enamel)	1	X	X	

^a Does not include material carried in "dedicated trucks."

^b Source: Reference 4.

^c Toxicity range reported for various mixtures of polypropylene glycol designated by the following numbers: 150, 400, 425, 750, 1025, 1200, 2025, 3025, and 4025.

^d Toxicity reported for Polymer X-150.

^e Toxicity range reported for various plasticizers designated as: C-316, 4GO, CPE and Z88.

^f Toxicity range reported for Alkanes 56, 60 and S.

^g Toxicity reported for enamel white (barium sulfate).

12.2.1 Contaminated wash water associated with cleaning operations

Washwater from tanking cleaning operations went through the separator tanks and then to the sewer line.²⁰ The only pretreatment that is required for aqueous discharges from Rogers is pH adjustment to protect the sewer lines.²¹ Monitoring is required for ammonia, nitrogen, pH, mercury, and cyanide, fluoride, chloride, total dissolved solids, and sulfate.²² They did not monitor for the types of chemicals that would have been present in the various product streams hauled by Rogers for shippers. Therefore, these chemicals would not have been reported as present in waste streams. For example, they would not monitor for ortho-nitrochlorobenzene because this is not required to be sampled in their permit.²³

The washing of trailers included internal and external washing. Saniflex is a product that would stick to the outside of trailers and would require a strong solvent to remove.²⁴

In 1981 Patterson Associates reported to the USEPA Region V that Rogers discharged an average of 45,000 gal/day for a five-day week operation.²⁵ They noted that Rogers did not know the names of the compounds in the wastewater. Patterson concluded that there is a high probability that rinse waters contain at least some regulated constituents. Wastewater from Rogers was identified as a potential source of treatment problems at the American Bottoms treatment plant in the 1988 timeframe.²⁶ These problems related to pH excursions (high and low), too much suspended solids, too much organic carbons and too much phenol.²⁷ Related to this problem was the build up of material in the separator pits at Rogers.²⁸

Rogers washed trailers used to haul Aroclors.²⁹ Sampling of the sewer water downstream of Rogers revealed that elevated levels of PCBs were present.³⁰ A Monsanto program to monitor PCBs in the sewers was begun the last week of December 1970.³¹ This revealed a high concentration of 2,110 ug/l in the Village sample. This was the only significant quantity measured and the probable source was judged to be Aroclor trailer washing at Rogers. Because Monsanto became concerned about PCB losses to the sewer system associated with this washing operation, Monsanto took over the washing process.^{32,33} This occurred in 1971.

²⁰ James E. Bucko testimony, 2/10/99 p.76

²¹ Walter G. Shifrin Deposition p. 23

²² Walter G. Shifrin Deposition. p. 26

²³ Richardson deposition, p. 462

²⁴ Donel Johnson testimony p. 129

²⁵ Patterson Associates Inc. 1981. Process screening evaluation of industrial waste toxicant discharges, Sauget IL. Report to Enforcement Division, U.S. Environmental Protection Agency. DCG 016572.

²⁶ Dave Kimbriel (Rogers Cartage) inter-office correspondence to Dave Kramp, 10/19/88, Rogers 0817

²⁷ Letter from Paul Sauget (Mayor) to J.D. Tolbird (Rogers), 12/16/88, Rogers 0820

²⁸ Dave Kimbriel (Rogers Cartage) letter to George Schillinger, 1/5/89, Rogers 0819

²⁹ Robert McCutchan deposition, 7/8/94 p. 229

³⁰ Arthur Leisy deposition, 5/11/94 p. 115

³¹ W. Engman interoffice correspondence to J.R. Savage, 1/5/71. DCG016963

³² Clarence Buckley deposition, 7/26/94 p. 157

12.2.2 Release of product materials for shippers associated with heel or residue

Tank trailers that were cleaned at Rogers commonly contained some residue or heel. This is product that remains in the trailer after delivery. From an operational standpoint most of the product would have been delivered from the shippers to the clients but not all of the product can be removed. If a large quantity is still in the trailer, the trailer is returned to the shipper.³⁴ However, the more common situation involves dealing with heel at the Rogers washing facility. It appears that the washing activities at Rogers allowed for heel to be disposed of down the drain.³⁵ Handling of heel differed depending on whether it was a top loading or bottom-loading trailer. For rear- and bottom-loading trailers, the heel could be more easily drained. For top-loading trailers this was not easily done. As a result, the heel or residue present in top-loading trailers was commonly removed through a process that resulted in disposal down the drains at Rogers.^{36,37,38,39} This heel was in the range of 30 to 50 gallons.⁴⁰ A second estimate placed the volume at 20 to 30 gallons.⁴¹

The heel present in top loading trailers containing orthonitrochlorobenzene were not placed in drums but were disposed of down the drain.⁴² This was because of the physical difficulty pressure associated with removing this material. (It had to be removed using air pressure and its handling was difficult.)

It also appears that disposal to the drains leading to sewer lines occurred at least a portion of the time for heels from rear- and bottom-loaded trailers as well.^{43,44,45,46} Management disputes the workers' contention that this occurred for either bottom-, rear- or top-loaded trailers.⁴⁷ However, it was also noted that there was no documentation that heels were being retrieved.⁴⁸ The first worker at the facility – Gilbert Johnson – was instructed to put the material down the sewer.⁴⁹ This also was the instruction given to John Johnson, another trailer washer.⁵⁰ This type of instruction was also given in the 1990s.⁵¹ Although management disputes the long-term practice of allowing heel to drain into the sewer, the Allyn Konrad (facility manager) proffer does suggest that this was the practice prior to receiving a permit for American Bottoms.⁵² Rogers received this permit in

³³ William B. Papageorge deposition, 10/21/94, p. 254

³⁴ James E. Bucko p. 580

³⁵ John C. Johnson deposition p.816

³⁶ John C. Johnson p. 816

³⁷ Gilbert Johnson deposition p. 825

³⁸ Donel Johnson deposition p. 61

³⁹ Charles Johnson Jr. deposition p. 32

⁴⁰ Donel Johnson deposition p. 60

⁴¹ Record of communication between Mike Grant, Chris Cahnovsky, and Ruth Levin on 4/2/98, Rogers 41813

⁴² Donel Johnson testimony, p. 114

⁴³ Gilbert Johnson deposition p. 824

⁴⁴ Donel Johnson deposition p. 88

⁴⁵ Charles Johnson Jr. deposition p 54

⁴⁶ John Johnson deposition p. 30

⁴⁷ Ruth Lewin testimony p. 310

⁴⁸ Ruth Lewin p. 694

⁴⁹ Gilbert Johnson deposition p. 837

⁵⁰ John Johnson deposition p. 21

⁵¹ Donel Johnson deposition p. 93

⁵² Allyn Konrad proffer, p. 740

Table 12-3. Chemicals-of-Concern Associated with Rogers Cartage

Chlorinated Organic Compounds	Hydrocarbons	Other Organic Compounds	Metals
PCBs	Naphthalene	Phenols	Thallium
Chlorinated benzenes	Other PAHs	Phthalates	Aluminum
Chlorinated Solvents			Mercury
alpha BHC			Zinc
			Phosphorus

Rogers was one of the trucking companies that hauled PCB-containing products (e.g., Aroclors) for Monsanto.^{60,61,62} This began in the mid 1960s and continued through the early 1970s. Therefore, PCBs were released by Rogers I in the 1960s to drainage leading to Dead Creek CS-F and by Rogers II to a sewer with three overflows to CS-A in the early 1970s. PCBs could be present in washwater and heels were probably also released. The high concentration of PCBs in the Village sewer downstream from Rogers was noted earlier in this chapter.

Chemicals detected by EPA Region V in 1982⁶³ for water include chrysene, toluene, ethylbenzene, phenol, 1,4-dichlorobenzene, naphthalene, butyl benzyl phthalate. Chlorobenzene, 1,1,1-trichloroethane, alpha BHC and mercury. Particular note was made of the mercury concentration for which the investigators noted that, "it is likely that they would exceed the RCRA limit for mercury in 40 CFR 261.24. Analysis of wastewater in the 1989 timeframe showed that Rogers was a source of phenols."^{64,65}

Admiral Environmental Services samples wastewater from Rogers in 1990 (Table 12-4). This sampling revealed high levels of ethylbenzene, chlorobenzene, xylene, phthalates, oil and grease, phenols, and metals including antimony, silver, mercury, beryllium, copper, nickel, thallium, and zinc. Among these metals, zinc in particular was present at high levels on both sampling dates.

Table 12-4. Wastewater Sampling at Rogers Cartage by Admiral Environmental Services

⁶⁰ Robert McCutchan deposition, 7/8/94, p. 228.

⁶¹ Wayne Krull deposition, 8/17/94, p. 56

⁶² Jack Molloy deposition, 2/13/95

⁶³ U.S. Environmental Protection Agency. 1982. Compliance Sampling Inspections. Toxics in the area of Sauget, IL. Region V Central District Office.

⁶⁴ Sheet with hand calculations at DCG 016706

⁶⁵ Dave Kimbriel inter-office correspondence to Paul Hinds, 3/17/89, DCG 016709.

Chemical	7/31/90 (received at Lab) ⁶⁶	6/12/90
Organic Chemicals		
Ethyl Benzene	8,840 ug/l	
Chlorobenzene	21,100 ug/l	
Xylenes	31,700 ug/l	
Di n octyl phthalate	360 ug/l	
Butyl benzyl phthalate	3,900 ug/l	
Phenols	1,030 ug/l	2,300 ug/l
Fats, oils & greases	181,000 ug/l	46,300 ug/l
Metals		
Antimony		100 ug/l
Silver		80 ug/l
Mercury		190 ug/l
Beryllium	100 ug/l	
Copper	110 ug/l	
Nickel	140 ug/l	
Thallium	200 ug/l	100 ug/l
Zinc	1,140 ug/l	1,330 ug/l
PH	2.7	

Sampling conducted of soils and groundwater at the Rogers property in 1992 also provides an indication of chemicals released to the environment. These results indicated elevated levels of the following chemicals: arsenic, PAHs, chlorinated benzenes, volatile hydrocarbons, and chlorinated solvents.

⁶⁶ Rogers 9543 - 19546

12.4 Table 12-5 - Summary of soil and groundwater analytical results at Rogers Cartage

Source: Montgomery Watson 1992

Chemical	Soil (mg/kg)			Groundwater (µg/l)		
	# Sampled	# Detected	Range (mg/kg)	# Sampled	# Detected	Range (µg/l)
Arsenic				6	2	12-114
Barium	4	4	137-198	6	6	115-1010
Cadmium	4	4	1.23-1.76	6	6	0.4-8.9
Chromium	4	4	11.8-15.8	6	6	2-85
Lead	4	4	10.0-15.0	6	2	18-50.1
Mercury	4	4	0.0204-0.0442	6	1	0.4
Selenium				6	3	4-14
TOC as % Organic Matter	2	2	0.36-1.46			
Total % Solids	7	7	70.6-82.7			
PH	6	6	7.12-10.04			
Total Petroleum Hydrocarbons	4	2	30-5700			
1-Methyl Naphthalene	7	2	1.3-89	8	1	1200
2-Methyl Naphthalene	7	2	2.3-130	8	3	26-1900
Acenaphthene				8	1	160
Acenaphthylene				8	1	14
Benzo(a)anthracene	7	1	0.23	8	1	13
Benzo(a)pyrene				8	2	0.59-4.1
Benzo(b)fluoranthene	7	3	0.0029-0.0081	8	3	0.015-6.0

Chemical	Soil (mg/kg)			Groundwater (µg/l)		
	# Sampled	# Detected	Range (mg/kg)	# Sampled	# Detected	Range (µg/l)
Benzo(g,h,i)perylene				8	1	0.12
Benzo(k)fluoranthracene				8	1	4.7
Fluoranthene	7	2	0.16-0.48	8	2	16-110
Fluorene	7	1	13	8	1	3.1
Naphthalene	7	2	0.83-28			
Indeno(1,2,3-ed)pyrene				8	1	0.23
Phenanthrene	7	3	0.046-28	8	3	8.6-380
Pyrene	7	2	1.6-100	8	1	50
1,2,4-Trichlorobenzene	7	1	0.069			
1,2,4-Trimethylbenzene	7	5	0.045-75	11	3	0.30-4.0
1,2-Dichlorobenzene	7	1	0.08	11	9	0.30-4000
1,3,5-Trimethylbenzene	7	3	0.35-30	11	1	0.30
1,3-Dichlorobenzene	7	1	0.4	11	1	10
1,4-Dichlorobenzene	7	4	0.099-220	11	4	0.20-830
4-Chlorotoluene	7	1	0.35			
Benzene	7	1	0.0076	11	2	0.30-7.0
Bromomethane	7	2	0.049-0.75			
Chlorobenzene	7	3	0.054-9.7	11	2	3.6-170
cis-1,2-Dichloroethene	7	1	0.044			
Ethylbenzene	7	5	0.099-30	11	3	0.30-15
Isopropylbenzene	7	3	0.27-24	11	2	1.4-15
m&p-Xylene	7	5	0.14-67	11	4	0.20-20
Methylene Chloride				11	1	4.1

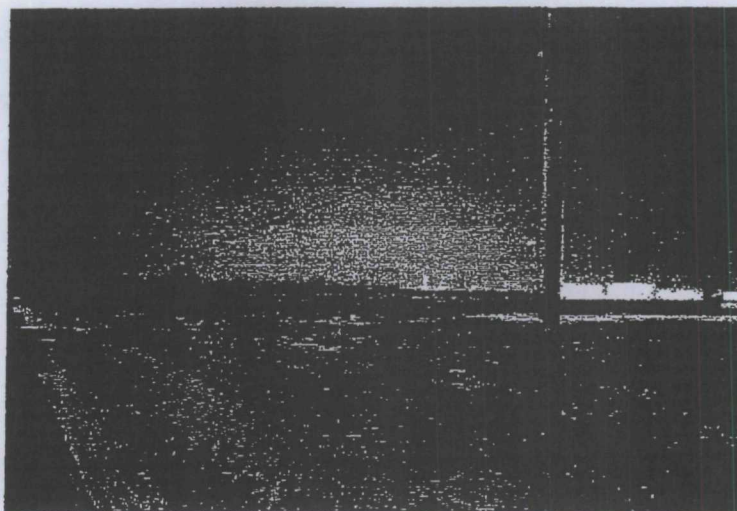
Chemical	Soil (mg/kg)			Groundwater (µg/l)		
	# Sampled	# Detected	Range (mg/kg)	# Sampled	# Detected	Range (µg/l)
Naphthalene	7	7	0.080-27	11	4	2.1-200
n-Butylbenzene	7	4	0.040-3.0	11	2	0.40-4.0
n-Propylbenzene	7	3	0.26-13	11	2	0.2-5.0
o-Xylene	7	4	0.092-35	11	3	1.3-130
p-Isopropyltoluene	7	3	0.04-8.9			
s-Butylbenzene	7	3	0.11-18	11	1	2.0
Styrene	7	1	1.6			
Tetrachloroethene				11	6	0.20-1.0
Toluene	7	1	0.023	11	3	0.30-80
Chlordane	3	1	1.1			

12.5 Transport Pathways from Rogers to Dead Creek

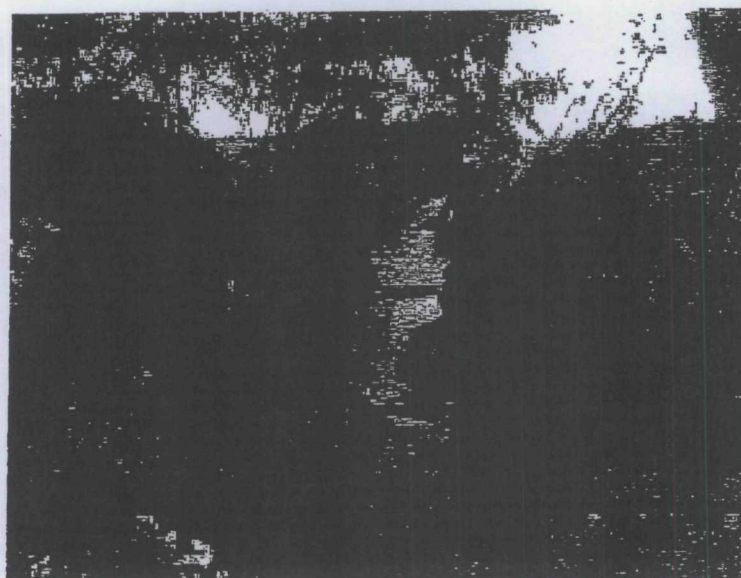
Roger I and Rogers II contributed contamination to Dead Creek via different pathways. For Rogers I, chemicals were transported from the wash area off Cargill Road, to a slough that flowed to Dead Creek CS-F. Rogers II contributed to the contamination of Dead Creek via discharges to the village sewer that was subject to frequent overflows into Dead Creek CS-A. Each of these is discussed below.

Drainage from Rogers I to Dead Creek CS-F

The former location of Rogers along Cargill Road can still be seen as remnants of the driveway coming off Cargill Road and concrete pads.



Surface drainage at this location is to the east and wash waters from this tank trailer wash location would eventually drain to Dead Creek. Flow from this (the north) side of Cargill Road to the south side and on to Dead Creek CS-A. Based on our observations such releases of water occur occasionally. When this happens the water overtops a berm constructed on Phillips Petroleum property. Such a release of water from Phillips Petroleum was documented in September 1999 and is shown below:



To confirm whether Rogers had released chemical to the north side of Cargill Road that could subsequently be transported to the south side and on to Dead Creek CS-F, soil samples were collected and analyzed for some of the chemicals Rogers is known to have carried in and washed out of its trailers. The analysis focused on chemicals that would be persistent because Rogers operated at this location during the 1960s. This included metals and PCBs (Table 12-4).

Rogers was known to transport metal-containing products such as aluminum chloride, zinc chloride, and zinc sulfate solution. Elevated levels of these metals relative to other metals and to background conditions are considered indicative of Rogers I as a source. While aluminum does not exhibit elevated concentrations, zinc does (Table 12-6). The presence of elevated zinc is consistent with other information available for Rogers. Data already presented indicate that Rogers hauled three zinc products. In addition, analyses of wastewater from Rogers II indicated elevated levels of zinc. Therefore, zinc has been shown to be present in trailer washwater from Rogers. At Rogers I this washwater drained along Cargill Road and eventually this drainage entered Dead Creek CS-F. The presence of elevated zinc in the drainage pathway supports the presence of this completed pathway.

During the 1960s, Rogers hauled PCBs for Monsanto. Trailers would have been washed at Rogers I. Table 12-6 shows that PCBs are present in the drainage pathway from Rogers I along Cargill Road. As with the elevated zinc, the presence of elevated PCBs in the drainage pathway supports the presence of this completed pathway.

Table 12-6. Metals and PCBs in surface soil samples up-gradient (SS-1) and along the drainage path (SS-2 through SS-5) from Rogers I along Cargill Road⁶⁷

	Soil Samples Collected Along North Side of Cargill Rd (mg/kg)				
Chemical	SS-1	SS-2	SS-3	SS-4	SS-5
Aluminum	12900	20200	15100	12700	11700
Arsenic	5.37	6.95	6.35	5.34	24.3
Barium	220	262	251	225	175
Cadmium	0.268	0.811	0.338	4.5	12
Chromium	15.5	24.1	18.8	20.5	23.5
Copper	15.1	24.1	18.7	41.6	94
Lead	11.6	18.8	12.4	86.9	239
Nickel	17.7	24.8	22.1	21.7	47
Vanadium	30.2	42.6	34	29.3	29.7
Zinc	73.8	166	86.2	1110	2470
Aroclor 1248	<0.05	7.1	6.6	20.2	18.6
Aroclor 1260	<0.05	0.3	0.1	1.6	0.4

The pattern of zinc and PCBs in synoptic sediment samples taken in Dead Creek are consistent with a contribution of Rogers I to Dead Creek CS-F. Figure 12-4 shows the pattern of zinc in surficial sediments collected as part of the Solutia EE/CA investigation. The figure shown a decrease in zinc concentrations from CS-B downstream toward CS-F. However, zinc increases to over 3,000 mg/kg at sampling location F-2. This location is in CS-F, just downstream of where drainage enters from the slough that received drainage from Rogers I.

Figure 12-5 illustrates the spatial pattern for total PCBs in Dead Creek. This figure also shows an increase in PCB concentrations in CS-F below where Dead Creek receives input from the slough.

⁶⁷ Samples collected by Environmental Operations on 6/13/02 and analyzed by Teklab

Figure 12-4
Zinc in Dead Creek Ecological Sediment Samples, Sauget Area 1

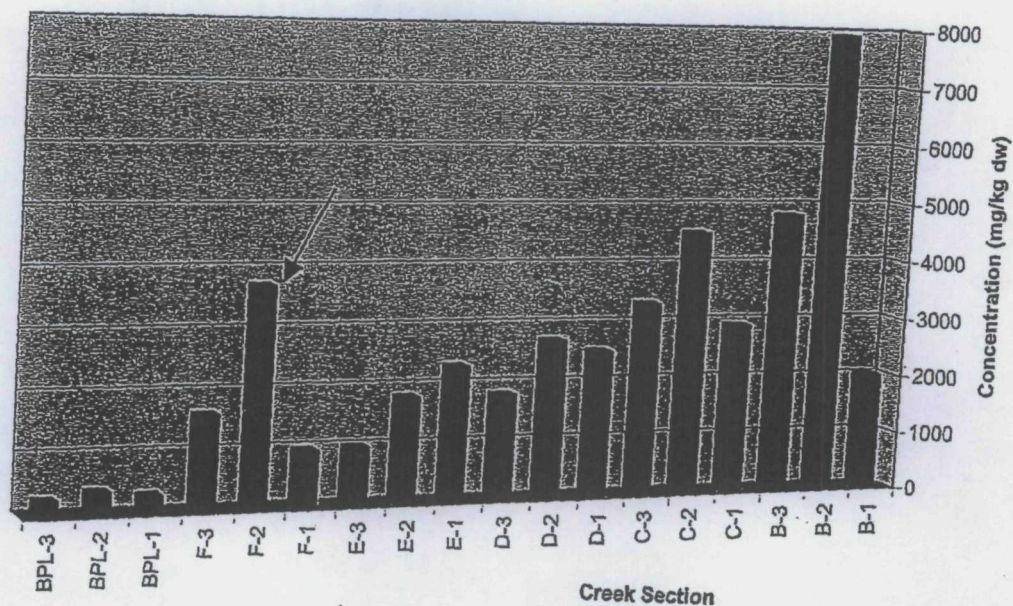
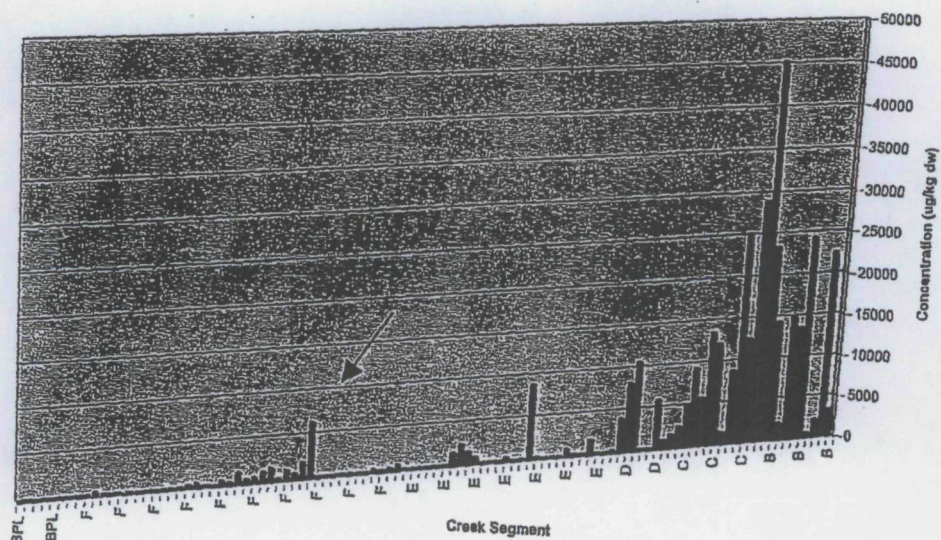


Figure 12-5
Total PCB Concentrations in Dead Creek Sediment (Full-Scan)



Sewer Overflow to CS-A

At the Sauget facility there were pits and traps in the wastewater line leading to the sewer. However, these are really designed to allow for deposition of solids and not for treatment of chemicals wastes.⁶⁸ In 1990 drawing Rogers is connected to the Village Sewer line via two lines. One handles office, shop rest rooms, and shop floors. The other handles truck washings.⁶⁹ The route of Rogers Waste in 1998 is indicated on a figure prepared for Rogers by P.H. Weis & Associates.⁷⁰

Rogers Cartage fed into the south trunk of the Village of Sauget sewer system. According to the evaluation of Morris, under normal conditions flow from Rogers went to the Mississippi River. However, when the system was surcharged, Rogers flow discharged into Dead Creek CS-A. Rainfall, industrial practices, the level of the river, and/or the failure of the pumps at the levee regularly surcharged the system. Therefore, Morris concluded that Rogers regularly contributed flow to CS-A.⁷¹

Ecology and Environment (1988) observed extreme discoloration and oily consistency of the water in CS-A that they felt indicated the existence of an ongoing unidentified source to this creek segment.⁷² Organic contaminants detected in sediment samples from CS-A included chlorobenzene, pentachlorophenol, PAHs, and PCBs. It is likely that these chemicals were all released by Rogers to the sewer system that overflowed to Dead Creek.

A TCLP extract was analyzed for a sludge composite from Rogers in 1998.⁷³ This report revealed the presence of barium, nitrobenzene and chlorobenzene. Such an analysis would not reveal the presence of chemicals that are not extracted by TCLP.

Direct Releases to the Creek

Charles McDonnell, a local resident, observed Rogers Cartage washing their trucks out directly into Dead Creek.⁷⁴

12.6 Contributions to Dead Creek Sediment Contamination

The procedure described in Chapter 2 was used to determine the Dead Creek sediment locations and creek segments for which Rogers Cartage is considered a contributor to contamination. The analysis involved comparing the sediment concentrations for Chemicals of Concern Associated with Rogers Cartage to the human health and ecological toxicity reference values for sediments listed in Table 2-3. The results of these comparisons are provided in Table 12-7. **Note this table is included on the CD**

⁶⁸ Franklin A. Phillips. Deposition p. 388

⁶⁹ Figure attached to letter from Harold Baker to Rogers Cartage, 4/3/90, Rogers 33682

⁷⁰ P.H. Weis & Associates Transmittal Letter to Ruth Levine, 12/15/98, Rogers 1701

⁷¹ Expert Report of C. Morris submitted to Husch & Eppenberger, October 2002.

⁷² Ecology and Environment, Inc. May 1988. Expanded site investigation: Dead Creek Project Sites.

⁷³ TEKLAB report #24158 to Rogers Cartage, 2/27/98, Rogers 12824

⁷⁴ Charles McDonnell deposition 1/6/00, p. 29

provided with this report. As the table indicates, Rogers Cartage is considered a contributor to sediment contamination throughout Dead Creek.

UNITED STATES OF AMERICA,)
)
 Plaintiff,)
)
 v.) Civil No. 99-63-GPM
)
 PHARMACIA CORPORATION, *et al.*,)
)
 Defendants.)

COMES NOW Charles A. Menzie, and states as follows:

2. Through my employment as an expert for Solutia Inc., I have personal knowledge of all matters set forth below.

3. I was asked by Solutia to oversee sampling at the location of Rogers Cartage Company's former Cahokia facility.

4. I oversaw both the design of the sampling protocol and the actual sample collection in March 2004.

EXHIBIT

Table 1. Rogers Cartage I Drainage Area Sampling

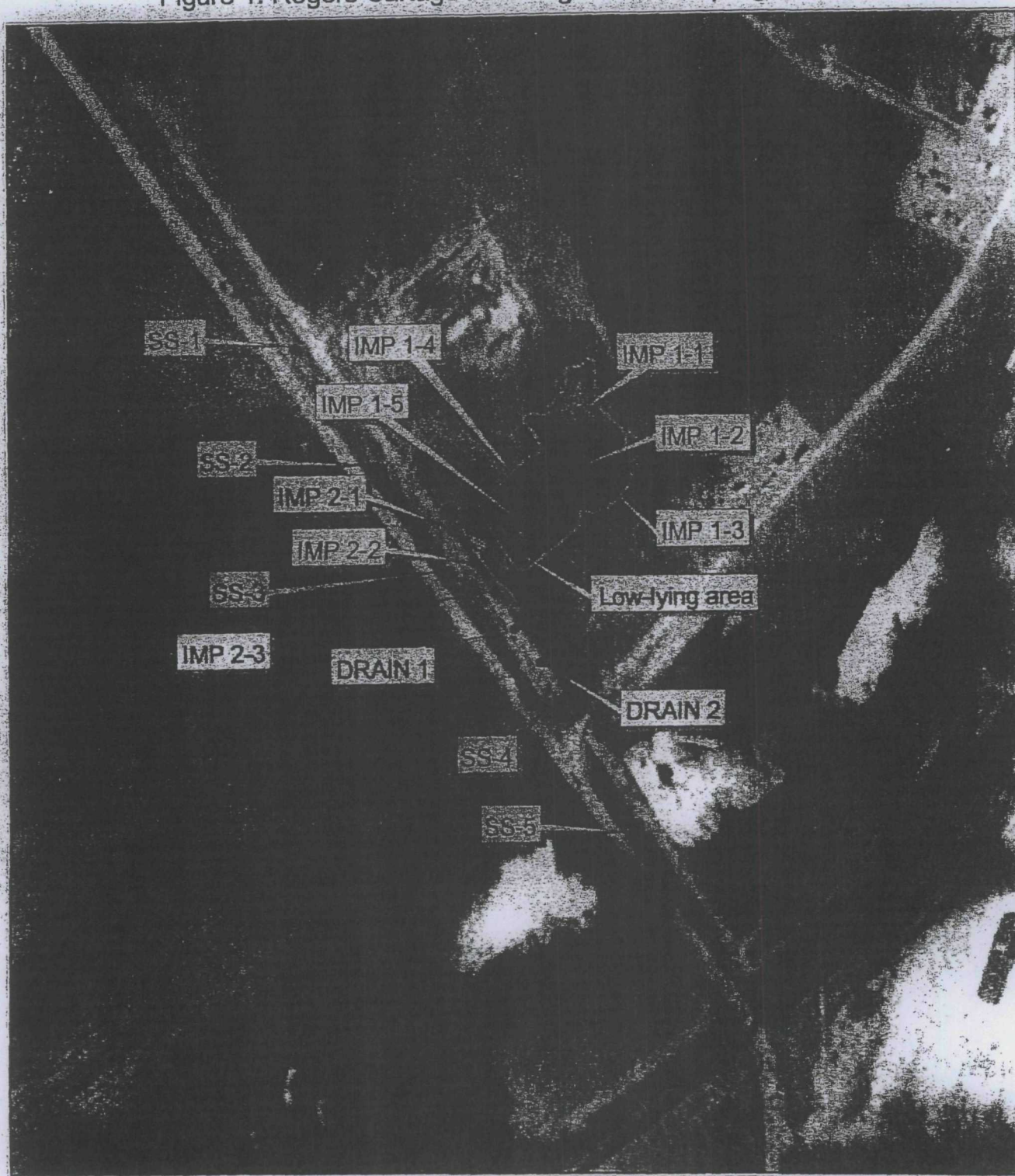
Location	Date	Sample Description	Start Depth (ft)	End Depth (ft)	Total PCBs (ppb)
Rogers Cartage I (off Cargill Road) Impoundment and Drainage Samples					
IMP 1-1	3/25/2004	upper impoundment	5	5.5	2,800,000
IMP 1-2	3/25/2004	upper impoundment	1	1.5	1,000,000
IMP 1-3	3/25/2004	upper impoundment	2	6	12,000
IMP 1-4	3/25/2004	upper impoundment	6	8	2,400
IMP 1-5	3/25/2004	upper impoundment	3	4	5,300,000
IMP 1-SS	3/25/2004	low-lying area	3	3	4,800,000
IMP 1-SS	3/25/2004	low-lying area	4	4	5,200
IMP 1-SS	3/25/2004	low-lying area composite	0	0.5	700,000
IMP 2-1	3/25/2004	lower impoundment	7	8	54,000
IMP 2-2	3/25/2004	lower impoundment	5	6	4,800
IMP 2-3	3/25/2004	lower impoundment	7	8	18,000
Drain 1	3/25/2004	drainage	4	4	61,000
Drain 2	3/25/2004	drainage	0.5	0.5	16,000
Soil Samples Collected Along North Side of Cargill Rd					
SS-1	6/13/2002	upgradient of drainage	0	0.25	100 U
SS-2	6/13/2002	along drainage path	0	0.25	7,400
SS-3	6/13/2002	along drainage path	0	0.25	6,700
SS-4	6/13/2002	along drainage path	0	0.25	21,800
SS-5	6/13/2002	along drainage path	0	0.25	19,000

EXHIBIT

3

tabbles

Figure 1. Rogers Cartage I Drainage Area Sampling Locations

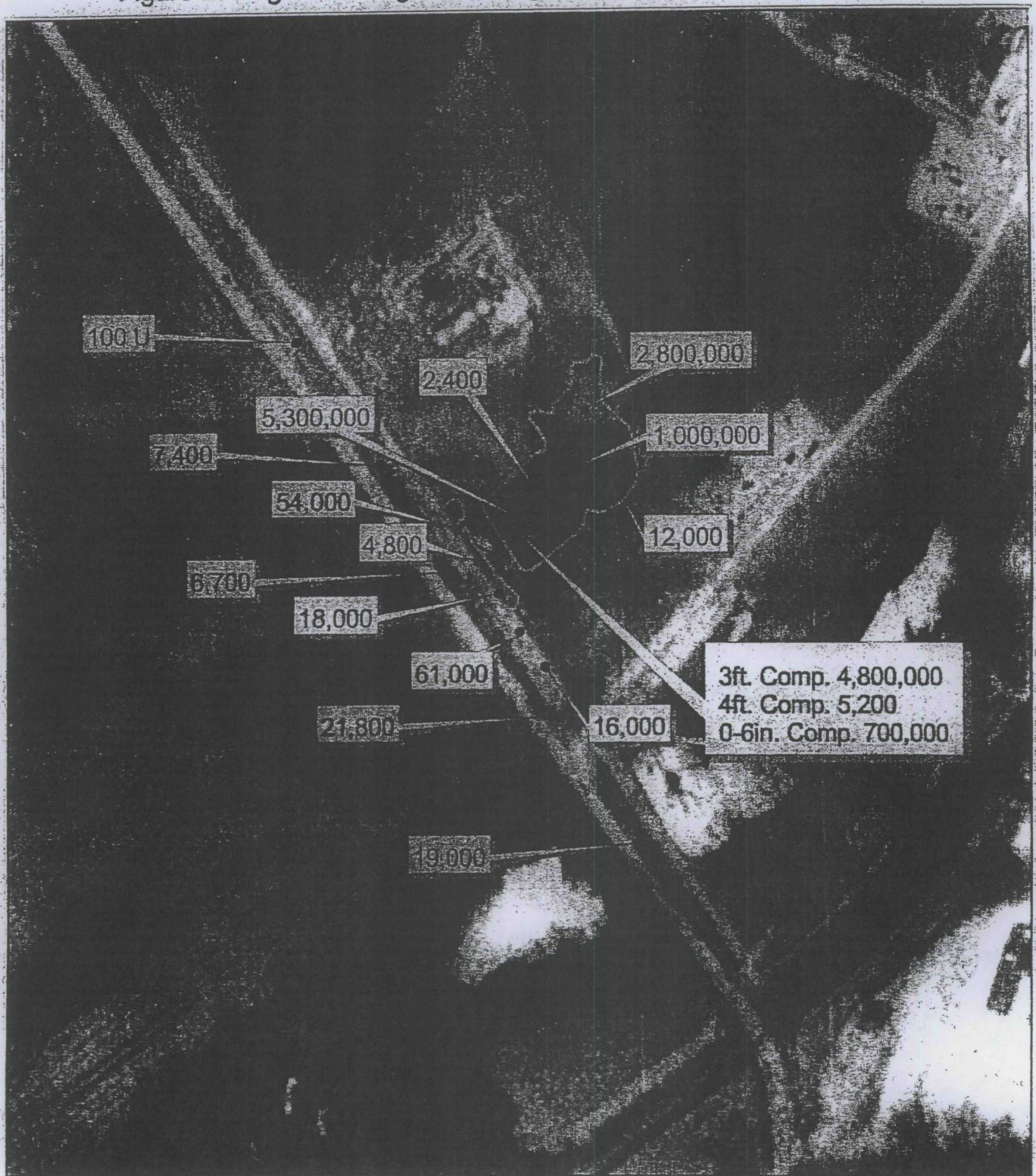


- 2002samples.shp
- 2004 lowlying.shp
- Samples 3/25/04
- - - 1967_impoundments.shp

100 0 100 200 Feet



Figure 2. Rogers Cartage I Drainage Area Total PCBs Data (ug/kg).



- 2002samples.shp
- 2004 lowlying.shp
- Samples 3/25/04
- 1967_impoundments.shp

100 0 100 200 Feet

